

Appendix E:

Ship Systems -- Work Breakdown Structure and Definitions

E.1 -- Scope

This appendix provides the ship system work breakdown structure. Definitions for the ship are provided in this appendix. Definitions for WBS elements common to the ship and all other defense materiel items are in Appendix H: Work Breakdown Structure Definitions, Common Elements.

E.2 -- Work Breakdown Structure Levels

Level 1	Level 2	Level 3
Ship System	Ship	Hull Structure Propulsion Plant Electric Plant Command and Surveillance Auxiliary Systems Outfit and Furnishings Armament Integration/Engineering Ship Assembly and Support Services
	Systems Engineering/ Program Management	Development Test and Evaluation Operational Test and Evaluation Mock-ups
	System Test and Evaluation	Test and Evaluation Support Test Facilities
	Training	Equipment Services Facilities
	Data	Technical Publications Engineering Data Management Data Support Data Data Depository

Peculiar Support Equipment	Test and Measurement Equipment Support and Handling Equipment
Common Support Equipment	Test and Measurement Equipment Support and Handling Equipment
Operational/Site Activation	System Assembly, Installation and Checkout on Site Contractor Technical Support Site Construction Site/Ship/Vehicle Conversion
Industrial Facilities	Construction/Conversion/Expansion Equipment Acquisition or Modernization Maintenance (Industrial Facilities)
Initial Spares and Repair Parts	

E.3 -- Definitions

E.3.1 -- Ship System

The complex of equipment (hardware/software), data, services, and facilities required to attain the capability of operating or supporting the operation of naval weapons, or performing other naval tasks at sea.

E.3.2 -- Ship

The waterborne vehicle of a ship system.

Includes:

- all types of surface and subsurface water vehicles such as combatants, auxiliaries, amphibious, and special-purpose ships
- design, development, and production of complete units (i.e., the prototype or operationally configured units which satisfy the requirements of their applicable specifications, regardless of end use)
- Sub-elements to the ship (E.3.2.1 -- E.3.2.9)

E.3.2.1 -- Hull Structure

The assembled main hull body with all structure subdivision.

Includes, for example:

- shell plating, longitudinal and transverse framing, platforms and decks, superstructure, foundations, structural bulkheads, enclosures and sponsors
- castings, forgings, and welds; fixed ballast; doors and closures; king-posts, masts, and service platforms; and sonar domes
- compartment testing.

E.3.2.2 -- Propulsion Plant

The major components installed primarily for propulsion and the systems necessary to make these components operable

Includes, for example:

- boilers and energy converters, propulsion units, main condensers and air ejectors, shafting, bearings, propellers, combustion air supply system, uptakes, propulsion control equipment, main stream, feed water and condensate, circulating and cooling water, fuel oil service and lubricating oil system
- nuclear steam generators, reactors, reactor coolant and auxiliary systems, nuclear power plant control, and radiation shielding

E.3.2.3 -- Electric Plant

The power generating and distribution systems installed primarily for ship service and emergency power and lighting.

Includes, for example:

- electric power generation, power distribution switchboards, power distribution system, and lighting system

E.3.2.4 -- Command and Surveillance

The equipment (hardware/software) and associated systems installed to receive information from off-ship source, to transmit to off-ship receivers, and to distribute information throughout the ship.

Includes, for example:

- sensing and data systems required for navigation and weapon fire control
- navigation equipment, interior communication systems and equipment, gun fire control system, nonelectronic countermeasure systems, electronic countermeasure systems, missile fire control systems, antisubmarine warfare fire control and torpedo fire control systems, radar systems, radio communication systems, electronic

navigation systems, space vehicle electronic tracking systems, sonar systems, electronic tactical data systems, and all associated software

E.3.2.5 -- Auxiliary Systems

The systems required for ship control, safety, provisioning, and habitability.

Includes, for example:

- the auxiliary machinery and piping systems; the hull mechanical handling systems; and ship control surfaces such as rudders, hydrofoils, and driving planes
- heating, ventilation, and air conditioning systems; refrigerating spaces
- plant and equipment
- gasoline, JP-5, all liquid cargo piping, oxygen-nitrogen and aviation lubricating oil systems
- plumbing installation, saltwater service systems, fire extinguishing systems, drainage, ballast, trimming, heating, and stabilizer tank systems
- fresh water system, scuppers and deck drains
- fuel and diesel oil filling, venting, stowage and transfer systems
- tank heating systems, compressed air system, auxiliary steam, exhaust steam and steam drains, buoyancy control system, distilling plant
- steering system; mooring, towing, anchor and aircraft handling systems; deck machinery; elevators; moving stairways; stores strikedown and stores handling equipment; operating gear for retracting and elevating units; aircraft elevators
- aircraft arresting gear, barriers, and barricades
- catapults and jet blast deflectors, replenishment at sea and cargo handling systems

E.3.2.6 -- Outfit and Furnishings

The outfit equipments and furnishings required for habitability and operability which are not specifically included in other ship elements.

Includes, for example:

- hull fittings
- boats, boat stowage and handlings

- rigging and canvas; ladders and gratings; nonstructural bulkheads and doors; painting, deck covering, hull insulation; storerooms, stowage and lockers
- equipment for utility space, workshops, laboratories, test areas, alley, pantry, scullery and commissary outfit
- furnishings for living spaces, offices, control centers, machinery spaces, medical, dental and pharmaceutical spaces; and nonpropulsion space shielding

E.3.2.7 -- Armament

The complex of armament and related ammunition handling, stowage, and support facilities; and cargo munitions handling, stowage, and support facilities.

Includes, for example:

- guns, and gun mounts; ammunition handling systems and stowage; special weapons handling and storage
- rocket and missile launching devices, handling systems and stowage
- air launched weapons handling systems and stowage; and cargo munitions handling and stowage

E.3.2.8 -- Integration/Engineering

The engineering effort and related material associated with the design, development, and rework to provide the ship as a whole exclusive of that included under the Systems Engineering/Program Management element.

Includes, for example:

- construction drawings, engineering calculations, weighing and weight calculation, photographs, models, and shipbuilders information drawings.

E.3.2.9 -- Ship Assembly and Support Services

The efforts and material associated with construction which cannot be logically and practicably identified with, or related to, other level 3 elements.

Includes, for example:

- staging, scaffolding, and cribbing; temporary utilities and services; molds, templates, jigs, fixtures, and special production tools; dry-docking, inspection, insurance, launching, and delivery.

E.3.3 -- WBS Common Elements

Definitions for common WBS elements applicable to the ship and all other defense materiel items are found in Appendix H: Work Breakdown Structure Definitions, Common Elements.